

who also wander up to the snow line. At a height of 13,000 feet he saw three elephants, and at night the shrill trumpeting of these animals could be heard round the station. On October 18 he found himself, most unwillingly, obliged to leave the elevated settlement and return to Taveita. The relatively great cold they had experienced had reacted very unfavourably on his men's health, and he feared that a longer delay might render them quite unfitted to carry burdens. He intended, however, to make his return journey entirely through a new and hitherto untraversed country, and this project somewhat consoled him for leaving the summit of Kilimanjaro still unconquered. Their downward journey, part of the way through trackless bush and dense dank forest, was not without adventure and some reward in scenery of great beauty. The average elevation of this country was between 8000 and 7000 feet, and the temperature consequently almost cool, ranging from 43° at night to 70° in the mid-day warmth. After some four hours' walking from their camp they crossed the long ridge that marked the southern flank of Kimawenzi, and began to descend the eastern slope of the mountain. Soon they emerged on a kind of heath-like country, and then looked forth on a splendid view stretching from Mwika to the mountains of Bura and Ukambani (the Kiulu range), with Jipe on one hand and the River Tzavo on the other. After some enjoyable excursions from his settlement at Taveita, finding that his funds would not support the expedition beyond the end of November, he made a rapid journey to the coast by way of Pare, Usambara, and the Rufu river to Pangani. At Zanzibar, finding there were no fresh funds to enable him to return to Kilimanjaro, he paid off the last of his faithful followers, many of whom had accompanied Thomson on his great journey, and took his passage on the British India steamer to Suez in quite a sulky frame of mind, as sorry to leave his beautiful mountain as many people are to quit England. Travelling overland from Suez, he arrived in London not much more than six weeks after he had caught his last glimpse of the snows of Kilimanjaro.

#### A SCANDINAVIAN LAND OF OPHIR

WE learn from *Naturen* that the little island in the Hardanger Fjord, known as Bömmelöen, which two years ago was an uninhabited and desolate spot, is now a busy scene of extensive gold-digging. Numerous English artisans and Norsk bricklayers and carpenters have for months been actively engaged in boring and sinking shafts into the rock, and in preparing houses and shelter for the men and machinery that have been drawn hither by the report of the discovery in 1882 of gold in the Storhangen mine. This discovery had been anticipated in 1862 by the find of a piece of pure gold, which was at once deposited in the mineralogical museum of Christiania, where it has since remained apparently unheeded, although the place and time at which it was found are duly marked on the corresponding label. After twenty years gold was again found in 1882, at the Storhangen mine, which was then being worked for copper ore. The result of this discovery was the purchase, in 1883, of the works by an English firm, trading under the title of the Oscar Gold Mining Company, which is worked under the scientific direction of Mr. Murchison. Considerable amusement seems so have been created among Norsemen by a somewhat ambiguous statement, set forth in the Company's circulars, which oracularly announces that "the gold finds at Bömmelöen are either Nature's greatest success or her greatest illusion!"

The geological formation of Bömmelöen is similar to that of other auriferous rocks, the gold being found in quartz, which occurs in strata never more than six feet thick, although of considerable extent, and generally underlying green (chloritic) schist. The greenstones of the island differ from those found in other parts of Norway, and contain glass and various typical volcanic products.

The operations of the Oscar Mining Company have given a new stimulus to the search for gold in Norway, and we learn that Herr Bakke, Inspector of Mines at Trondhjem, has officially reported the discovery of virgin gold in a piece of chloritic slate from Stegen in Nordland, while it is authoritatively stated that gold has been found within the last year or two at Sveen in the Bergen-Amt, and also near Stavanger. In the latter case the discoverer, Nils Berg, an old experienced Australian gold-digger, washed the gold from the mud remaining at the bottom of a shaft that had been sunk in a copper mine.

#### SCIENTIFIC SERIALS

*Wiedemann's Annalen*, vol. xxiv. January 1885.—O. Lehmann, on the melting-points of bodies in contact, and on the electrolysis of solid iodide of silver. A remarkable paper, accompanied with an elaborate plate describing phenomena of crystallisation observed chiefly with microscope at limiting edge of two crystallisable liquids or solutions. Iodide of silver presents certain closely-related phenomena under electrolysis, both in molten and in solid condition. Regular crystalline iodide of silver conducts an electric current, the silver being carried in the direction of the negative current through the crystal without its structure being disturbed. In its electrolysis, however, there appears a streaking in the direction of the flow of the current.—W. von Bezold, on a new kind of cohesion-figures. These experimental researches relate to the quasi-dendritic forms observed when one liquid descends through another.—L. Boltzmann, on the possibility of founding a kinetic theory of gases on attractive forces alone. This is an attempt to dispense with Maxwell's hypothesis that molecules repel one another in the inverse fifth power of the distance, which he framed to account for the apparent perfect elasticity exhibited by molecules of gases. Boltzmann proposes a new theory, based on attraction, very similar to that recently independently propounded by Sir W. Thomson (*NATURE*, August 28, 1884).—O. Chwolson, on the calibration of the plug-rheostats of Siemens and Halske. This discusses corrections for the resistance of connecting-pieces, &c.—F. Kohlrausch, the electric conductivity of water distilled *in vacuo*. A column of pure water 1 metre long and of 1 square millimetre section has a resistance of about  $4 \times 10^{10}$  ohms.—G. Kirchhoff, on the change of form which an elastic body experiences when it is magnetically or dielectrically polarised. This paper, originally published in the *Proceedings* of the Berlin Academy, deals analytically with the phenomenon of electrostriction investigated by Lorberg and others.—A. Schuster, on the discharge of electricity through gases. Treats of certain points in dispute between the author and Profs. Goldstein and E. Wiedemann. The author pronounces in favour of the view that all the phenomena of effect of magnetism, &c., upon the discharge of the negative electrode may be explained if it be admitted that the negatively-charged portions of the gaseous molecules are driven off from the kathode.—E. Goldstein, on electric conduction in the vacuum. Discusses some experiments in which a carbon filament lamp was employed; the filament forming one electrode, a platinum wire being inserted through the glass to serve as another electrode for the discharge, which was obtained, without an induction-coil, with electromotive forces of about 300–350 volts.—Werner Siemens, contributions to the theory of magnetism. Describes experiments on partially-closed magnetic circuits of iron, giving rise to the opinion, that the harder a specimen of iron is, the greater is the value of the magnetising force at which the maximum of permeability is observed. Also, the magnetic resistance of air is from 480 to 500 times as great as that of iron.—H. Hertz, on the dimensions of unit of magnetic pole strength in different systems of measurement.—E. Ketteler, the optical constants of magnetic media. Develops equations relating to Kundt's recent magneto-optic observations.—E. von Fleischl, the double refraction of light in fluids. Proves that in optically-active liquids the rotation is due to the existence of double refraction. Double-refracting liquids have no optic axis, and the wave-surface consists of two concentric spherical sheets.—W. von Voigt, on the measurement of the refractive indices of absorbing media. Recommends the prism method as more accurate than the total-reflection method.—W. von Voigt, on the theory of reflection and refraction at the boundary of crystalline media. New equations based on the author's theory of the reactions between matter and ether in transparent media, and leading to same conclusions as Kirchhoff's older theory.

*Journal de Physique*, November, 1884.—J. Jamin, on hygrometry. The author proposes to substitute for the "relative humidity" a new coefficient termed the "hygrometric richness," which is the ratio of the actual pressure of aqueous vapour of the air to the difference between the total atmospheric pressure and the actual vapour pressure. The substitution appears to be both rational and instructive.—Ch. Rivière, essay on cooling power of gases. Confirms formula of Dulong and Petit up to 400° C., but above that temperature the observed value is lower than the theoretical. Also appears to prove that at very low pressures cooling power is independent of the chemical composition

of the gas.—C. Decharme, imitation of the phenomena of electricity and magnetism by means of liquid and gaseous currents. Summarises number of experimental researches.—A. Kundt, electromagnetic rotation of plane of polarisation of light transmitted through films of iron, cobalt, and nickel; an abstract from the Berlin *Berichte*.—E. Bazzi, on the heat developed by a current during the variable period. Experiments show Joule's law still to hold good, assuming Helmholtz's equations true. It has been remarked by Blaserna that this is not incompatible with the existence of oscillations in the extra-current, for Helmholtz's expression, though only a first approximation which omits the terms that would express these oscillations, is probably not far from the mean result.—The remainder of this number consists of abstracts of papers by Amagat, Baille, H. Fecquerel (on infused rays), Cornu, Witz, and by Berthelot and Ogier from the *Annales de Chimie et de Physique*.

December, 1884.—E. Villari, new researches on the electric figures of condensers. The ramifications observed in the dust-figures are believed to be due to partial internal discharges.—E. Villari, microscopic researches on the traces of electric sparks engraved on glass, and on the diameter of these sparks. Tinted zones are observable where these sparks have passed over the surface of the glass. These traces vary with the glass, not with the nature of the electrodes; they are not removed by acids, and are probably due to heat. The cross section of the spark is, for a constant potential, proportional to the charge which produces it.—E. Villari, on the total heat developed by one or more sparks generated by the discharge of a condenser.—E. Villari, singular mechanical effect of the electric discharge. Glass plates, even strong thick ones, are easily broken by the spark of a Leyden battery, provided one face be silvered.—A. Righi, on a recent interpretation of Hall's phenomenon. Bidwell's theory of Hall's phenomenon appears to fail in the case of bismuth, in which Hall's phenomenon exists most markedly. It is also to be remarked that the variation of the electric resistance of bismuth, when subjected to the magnetic field, is greater than that of any other metal.—R. Weber, the electric siren. This instrument produces tones in a receiving telephone by causing rheotomes having different numbers of peripheral contacts rotated at a uniform speed to interrupt the circuit of a battery. The author draws a number of conclusions relatively to the partial and resultant tones, which are hardly justified when one considers the non-sinusoidal character of the variations of the current.—F. Melde, acoustical experiments, abstracted from *Wied. Ann.*—P. de Heen, determination of the general law governing the dilatation of any chemically definite liquid. The author assumes that the molecules attract one another in the inverse seventh power of the distance. Whatever may be thought of the hypothesis, there is an interesting coincidence running through his figures.—The remainder of the number is filled with abstracts of papers from the *Nuovo Cimento*, the most important of them being by E. Wiedemann, on the density of the luminiferous ether, and by Profs. Bellati and Romanese, on some remarkable thermic properties of the iodides of silver and copper.

*Rendiconti del Reale Istituto Lombardo*, December 11, 1884.—Report on the results of the International Medical Congress held at Copenhagen during the month of August, by Prof. G. Sangalli.—On the influence of high temperatures on the development of microbes, by Prof. L. Maggi.—A study of the earthquake which occurred at Ischia on July 28, 1883, by Prof. Giuseppe Mercalli.—On the secular variation in the elements of terrestrial magnetism at Como, by C. Chistoni.—Descriptive catalogue of sixty-three hitherto unpublished Pontifical coins and medals in the Royal Numismatic Cabinet at Milan, by E. B. Biondelli.—The paintings of the Italian masters in the public museums of Europe, in connection with Senator Morelli's recent work, by Prof. G. Mongeri.—Critical notes on the fourth book of the pseudo-Theophilus, by Prof. C. Ferrini.—Meteorological observations made at the Brera Observatory, Milan, during the months of November and December 1884.

*Journal of the Russian Chemical and Physical Society*, vol. xvi. fasc. 7.—On the heat of combustion of organic matters, by W. Longuine; being a description of the methods resorted to by the author in his series of determinations preliminary to the subsequent publication of the results obtained. The paper is accompanied by several plates.—Analysis of a saltpetre earth from Turkestan, by N. Lubavin. It is taken from the ruins of Kunya-Urgench, the climatic conditions being altogether very

favourable for its formation, and its abundance explains the cheapness of gunpowder at Khiva. It contains 6 per cent. of azotic anhydride. The remarks of the author as to the connection between the formation of saltpetre and the inundations of the Amu are worthy of notice.—Review of the Russian chemical literature for the year 1883 and first quarter of 1884.—We notice the appearance of a fifth edition of the excellent manual of analytic chemistry by M. Menshutkin, as also of his lectures on organic chemistry (lithographed), which are now in print; a third edition of P. Alexeyeff's organic chemistry; and a second edition of the principles of chemistry, by A. Potylitsin, not to speak of several translations. As to separate monographs, besides those already mentioned by NATURE, the following are worthy of notice:—The organic compounds in their relations to the haloid salts of aluminium, by G. Gustavson—a work which has obtained the premium of the Chemical Society; on the relations between the compositions and refractory power of organic compounds, published at Kazan, which has raised a serious and useful discussion between Russian chemists; and an inquiry into the atoms and the measurement of their size, by O. Trojanovski (Warsaw).—On the electrical discharge in gases, by M. Goldhammer; being a series of experiments for determining the temperature in Geissler tubes. When rarefied air is taken for the experiment, its heating does not depend on its elasticity so long as this last remains within the limits of 8.4 to 38 millimetres; but it decreases with the decrease of the electrical current. The distribution of temperature on the surface of the tube is shown by a series of curves. An interesting observation made by the author is that phosphorescent light on the surface of the glass, such as Prof. Crookes considered as appearing only at pressures equal to millionth parts of an atmosphere, appeared also at pressures from 1.3 to 0.8 millimetres, the glass of the tube not belonging to the category of uranic glass, and the phosphorescent light appearing invariably on the calode, even when the direction of the current has been changed.—Preliminary report on the influence of compression of iron and steel on their magnetisation, by P. Bakhmeteff.—On the hail of July 11, 1884, at Kharkoff, by N. Piltchikoff—a description, with figures, of the hailstones.—On the shock of absolutely rigid bodies, by N. Joukovsky; being a mathematical critique of the theories advanced on this subject by MM. Matson, Prof. Shiller, at Kieff, and M. Garrigou-Lagrange.—On the dilatation of liquids, by M. Avenarius, against Prof. Mendeléeff's formula and in favour of the expression  $v = a + C \log (T - t)$ .—On the regular forms taken by powders, by Th. Petrushevski.

## SOCIETIES AND ACADEMIES

### LONDON

**Royal Society**, January 8.—“Experimental Researches in Magnetism.” By Prof. J. A. Ewing, B.Sc., F.R.S.E., University College, Dundee. Communicated by Sir William Thomson, F.R.S.

The paper describes in detail experiments of which preliminary notices have already been published in the *Proceedings* of the Royal Society, vol. xxxiv. p. 39, and in the *Philosophical Magazine*, November, 1883. The experiments relate to—

- (1) The magnetic susceptibility of iron and steel, the form of the magnetisation curve, and the changes of magnetism caused by cyclic changes of magnetising force.
- (2) The influence of vibration on magnetic susceptibility and retentiveness.
- (3) The influence of permanent strain on magnetic susceptibility and retentiveness.
- (4) The energy expended in producing cyclic changes of magnetisation.
- (5) The ratio of residual to total induced magnetism.
- (6) The changes of induced and residual magnetism caused by changes of stress.
- (7) The effects of constant stress on magnetic susceptibility and retentiveness.
- (8) The changes of magnetism caused by changes of temperature.
- (9) The effect of temperature on magnetic susceptibility.

The experiments were conducted on pieces of metal which gave as near an approach to the condition of uniform magnetisation as is practically attainable.

Curves are given which show the behaviour of iron and steel in various states of temper when subjected to a first application